AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A flotation device including:

a sequence of at least two flotation tanks arranged relatively as an upstream tank and a downstream tank, each of said tanks being adapted to receive slurry incorporating fine and coarse particles containing minerals to be extracted, and each of said tanks including:

a feed inlet for admission of slurry;

agitation means to agitate the slurry;

aeration means to aerate the slurry whereby floatable minerals in suspension float upwardly to form a surface froth;

an overflow launder for removal of the surface froth; and

a bottom outlet for withdrawal of relatively coarse or dense components of the slurry;

wherein the bottom outlet from the upstream tank is connected to the feed inlet of the downstream tank whereby a relatively dense fraction of the slurry including a relatively high proportion of coarse or dense components is withdrawn from the upstream tank and fed directly to the downstream tank for reprocessing in the downstream tank; and

wherein at least one of said tanks includes an upper side outlet adapted for withdrawal of a relatively fine fraction of the slurry including a relatively high proportion of fine or lower density components for separate size processing independently of the upstream and downstream tanks.

2. (Original) A flotation device according to claim 1, comprising a sequence of three or more of said tanks connected in series, with the bottom outlet of each tank save for the last being connected to the feed inlet of the tank immediately downstream.

3. (Currently Amended) A flotation device according to claim 1 ~~or claim 2~~, wherein each of said tanks includes a respective upper side outlet.

4. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein each of said tanks includes a substantially flat base and wherein the bottom outlet of each tank is formed in a sidewall of the tank adjacent the base.

5. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein at least one of said side outlets is adapted to remove slurry containing a relatively high proportion of gangue slimes from the top half of the tank.

6. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein at least one of said side outlets is adapted to remove slurry containing a relatively high proportion of gangue slimes from between a mixing zone of the rotor and a froth zone near the tank surface.

7. [(Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein at least one of said side outlets is adapted to remove slurry from the top third of the tank.

8. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein at least one of said side outlets includes a fluid conduit extending inwardly from the tank sidewall.

9. (Original) A flotation device according to claim 8, wherein the conduit terminates near the centre of the respective tank, generally proximal a vertical axis thereof.

10. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein at least one of said side outlets directs the lower density components to a separate slurry processing unit configured for optimal treatment of relatively fine particles.

11. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein at least one of said tanks further includes a top substantially hollow deflection cone fixed with respect to the tank and extending generally around the drive shaft.

12. (Original) A flotation device according to claim 11, wherein at least one of said tanks further includes a fluid conduit extending through a sidewall of the top cone to the respective side outlet to facilitate fluid transfer from within the top cone to the side outlet.

13. (Currently Amended) A flotation device according to claim 11 ~~or claim 12~~, wherein a corresponding at least one of said tanks further includes a bottom substantially hollow deflection cone, also extending generally around the drive shaft, at a position below the top cone.

14. (Original) A flotation device according to claim 13, wherein the bottom cone is axially movable relative to the drive shaft to allow an area of an annular opening between the top and bottom cones to be selectively adjusted.

15. (Currently Amended) A flotation device according to claim 13 ~~or claim 14~~ wherein a lower end of the top cone is nested at least partially within an upper end of the bottom cone.

16. (Currently Amended) A flotation device according to ~~any one of claims~~ claim 11 ~~to 15~~, wherein the top cone is truncated and includes an opening at its lowermost end.

17. (Currently Amended) A flotation device according to ~~any one of claims 11 to 16~~ claim 13, wherein the lowermost end of the bottom cone fits relatively closely around the drive shaft, thereby substantially to impede slurry flow through a region between the lowermost end of the bottom cone and the drive shaft.

18. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein the agitation means of each of said tanks includes a rotor supported for rotation within a surrounding stator, and operable by means of a central drive shaft extending downwardly into the respective tank.

19. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein the aeration means of each of said tanks includes an air blower and a fluid conduit for directing air from the blower into the respective agitation means.

20. (Currently Amended) A flotation device according to claim ~~16~~ 19, wherein the fluid conduit of the aeration means includes an axial bore extending through the drive shaft of the respective rotor.

21. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein each of said tanks is generally in the shape of a right circular cylinder.

22. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein the bottom outlet of each of said tanks is defined by an opening in the lower half of the tank.

23. (Original) A flotation device according to claim 22, wherein the opening defining the bottom outlet of each of said tanks is defined in the respective tank sidewall adjacent the tank floor.

24. (Original) A flotation device according to claim 22, wherein the opening defining the bottom outlet of each of said tanks is defined in the respective tank floor adjacent the tank sidewall.

25. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, including a plurality of downstream tanks connected in series, each configured for optimal treatment of a slurry including a relatively high proportion of relatively coarse or dense components and each having an inlet connected to the bottom outlet of its adjacent upstream tank.

26. (Original) A flotation device according to claim 25, wherein all of the downstream tanks are substantially identical, with each tank including a side outlet for withdrawal of relatively lower density components of the slurry from an adjacent upstream tank.

27. (Currently Amended) A flotation device according to claim 25 ~~or claim 26~~, wherein a side outlet of each tank directs lower density slurry components to a separate slurry processing unit configured for optimal treatment of relatively fine particles.

28. (Currently Amended) A flotation device according to claim 25 ~~or claim 26~~, wherein only the third and subsequent tanks in the series include a side outlet for withdrawal of relatively lower density components of the slurry from the tank.

29. (Currently Amended) A flotation device according to ~~any one of claims~~ claim 25 ~~to 28~~, wherein ~~a~~ the plurality of said tanks is arranged in pairs, wherein the level of the base of each successive tank pair is lower than the base of its adjacent upstream pair, such that slurry flows under the influence of gravity from one tank pair to the next.

30. (Currently Amended) A flotation device according to ~~any one of claims~~ claim 25 ~~to 28~~, wherein the plurality of tanks is arranged in groups of more than two, wherein the level of the base of each successive tank group is lower than the base of the adjacent

upstream group, such that slurry flows under the influence of gravity from one tank group to the next.

31. (Original) A flotation device according to claim 29, wherein the outlet from one tank pair to the adjacent downstream tank pair includes a valve to allow discharge of the relatively coarse or dense components of the slurry.

32. (Original) A flotation device according to claim 31, wherein the valve is a dart valve.

33. (Original) A flotation device according to claim 32, wherein the valve is positioned substantially within the tank adjacent the outlet.

34. (Original) A flotation device according to claim 32, wherein the valve is positioned in a conduit extending between adjoining tanks.

35. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein each tank has a capacity of at least $100m^3$.

36. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein the slurry entering said upstream tank via the feed inlet includes less than around 55% solids.

37. (Currently Amended) A flotation device according to ~~any one of the preceding claims~~ claim 1, wherein the agitation means of each tank is aligned with the respective feed inlet, such that feed slurry entering the tank flows directly into the agitation means.

38. (Currently Amended) A method of separate size flotation including the steps of:

providing a flotation device as defined in ~~any one of claims~~ claim 1 ~~to 37~~;

directing a feed slurry into the flotation device through the feed inlet of the upstream tank;

withdrawing the relatively dense fraction of the slurry through the bottom outlet of the upstream tank and feeding that fraction through the feed inlet of the downstream tank, for reprocessing in the downstream tank; and

withdrawing the relatively fine fraction of the slurry through the side outlet for separate size processing independently of the upstream and downstream tanks.

39. (Original) A method according to claim 38, wherein after withdrawal through the side outlet, the relatively fine fraction of the slurry is directed into one or more downstream fine particle flotation tanks specifically configured for optimal recovery of relatively fine particles.

40. (Original) A method according to claim 39, wherein after withdrawal from the tank and where the fine particles are predominantly gangue slimes, they are discarded.

41. (Currently Amended) A method according to ~~any one of claims~~ claim 38 ~~to~~ ~~40~~, wherein after withdrawal from the tank, the relatively coarse or dense components are directed into a separate series of one or more downstream coarse particle flotation tanks.

42. (Currently Amended) A method according to ~~any one of claims~~ claim 38 ~~to~~ ~~41~~, including the steps of providing a sequence of three or more of said tanks, and

connecting said tanks in series with the bottom outlet of each tank save for the last being connected to the feed inlet of the tank immediately downstream.

43. (Original) A method according to claim 42, including the further step of providing each of said tanks with a respective upper side outlet.

44. (Currently Amended) A method according to ~~any one of claims~~ claim 38 ~~to~~ ~~43~~, including the further step of positioning each downstream tank at a level below the tank immediately upstream thereof, to facilitate gravity feed of slurry through the series of tanks.

45. (Currently Amended) A method according to ~~any one of claims~~ claim 38 ~~to~~ ~~44~~, including the step of adding a flotation reagent to the slurry in the downstream tanks.

46. (Currently Amended) A method according ~~any one of claims~~ claim 38 ~~to 45~~, including the step of diluting the slurry in the downstream tanks.

47. (Currently Amended) A method according to ~~any one of claims~~ claim 38 ~~to~~ ~~46~~, wherein the tanks have a capacity of at least $100m^3$.

48. (Currently Amended) A method according to ~~any one of claims~~ claim 38 ~~to~~ ~~47~~, wherein said feed slurry includes less than around 55% solids.